

**12075**

Olivine Basalt

232.5 grams

DRAFT□



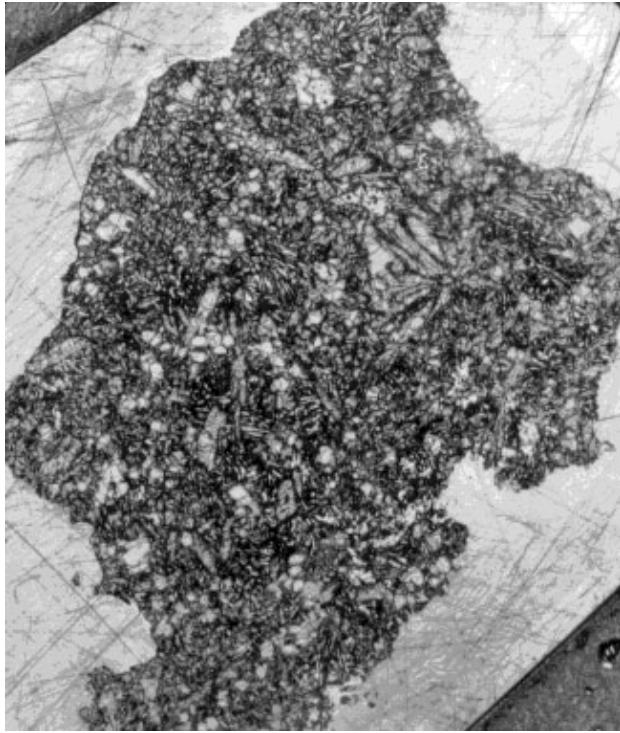
Figure 1: Photo of 12075,4. Sample is 4 cm across. NASA # S70-44018.

### **Introduction**

12075 is a vuggy, medium-grained olivine basalt with olivine and pyroxene phenocrysts set in a variolitic groundmass (figures 1 and 3). It was termed an “olivine-dolerite cumulate” by Gay et al. (1971). 12075 hasn’t been dated.

### **Petrography**

Champness et al. (1971) give a brief description of 12075: “This is a medium-grained basic igneous rock in which pyroxenes (about 20%) and olivine (20%) phenocrysts (lengths < 3 mm) are embedded in a matrix of finer-grained, irregular intergrowths of pyroxene, plagioclase laths (20 – 50 microns in width and mostly



*Figure 2: Photomicrograph of thin section 12075,25. Scale is 1 cm. NASA # S70-46347.*

untwinned) and elongated lamellae of ilmenite". Olivine crystals tend to occur in aggregates. Gay et al. (1971) reported melt inclusions in olivine.

Figures 2 and 4 show an unusual spray of large pyroxene grains radiating from a common point.

### Mineralogy

**Olivine:** Olivine composition is Fo<sub>78-67</sub> (Champness et al. 1971).

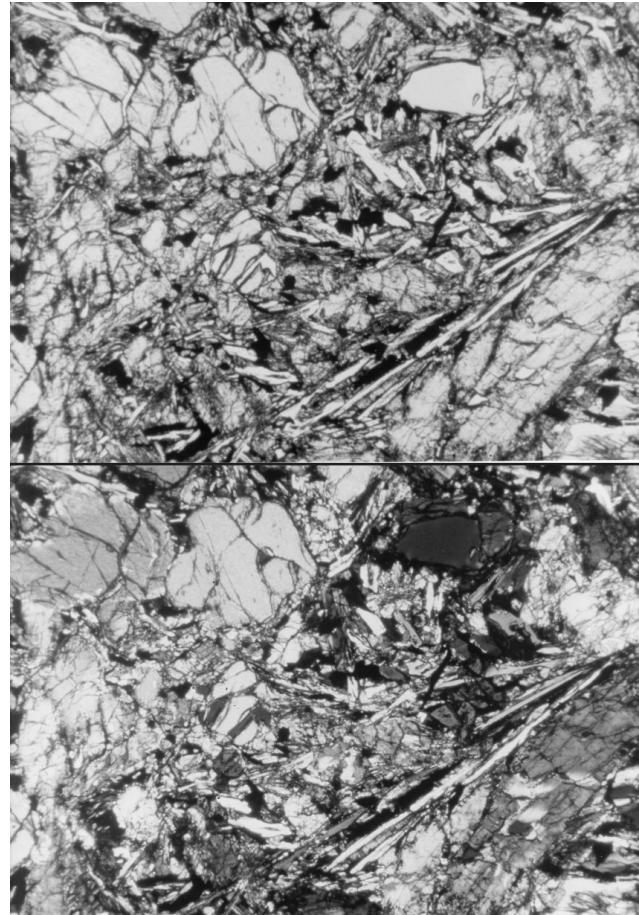
### Chemistry

Wakita et al. (1971), Cuttitta et al. (1971), Hubbard and Gast (1971), Haskin et al. (1971) and Engle et al. (1971) determined the chemical composition of 12075 (table 1, figures 5 and 6).

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### **Mineralogical Mode for 12075**

	Neal et al. 1994	Papike et al. 1976
Olivine	15.7	20.5
Pyroxene	57.5	58
Plagioclase	21.7	13.2
Opacites		8
Ilmenite	0.6	
Chromite +Usp	2.7	
mesostasis	1.6	0.2
"silica"		



*Figure 3: Photomicrographs of 12075,23. Field of view 2.6 mm. NASA # S70-49949-950.*

### Radiogenic age dating

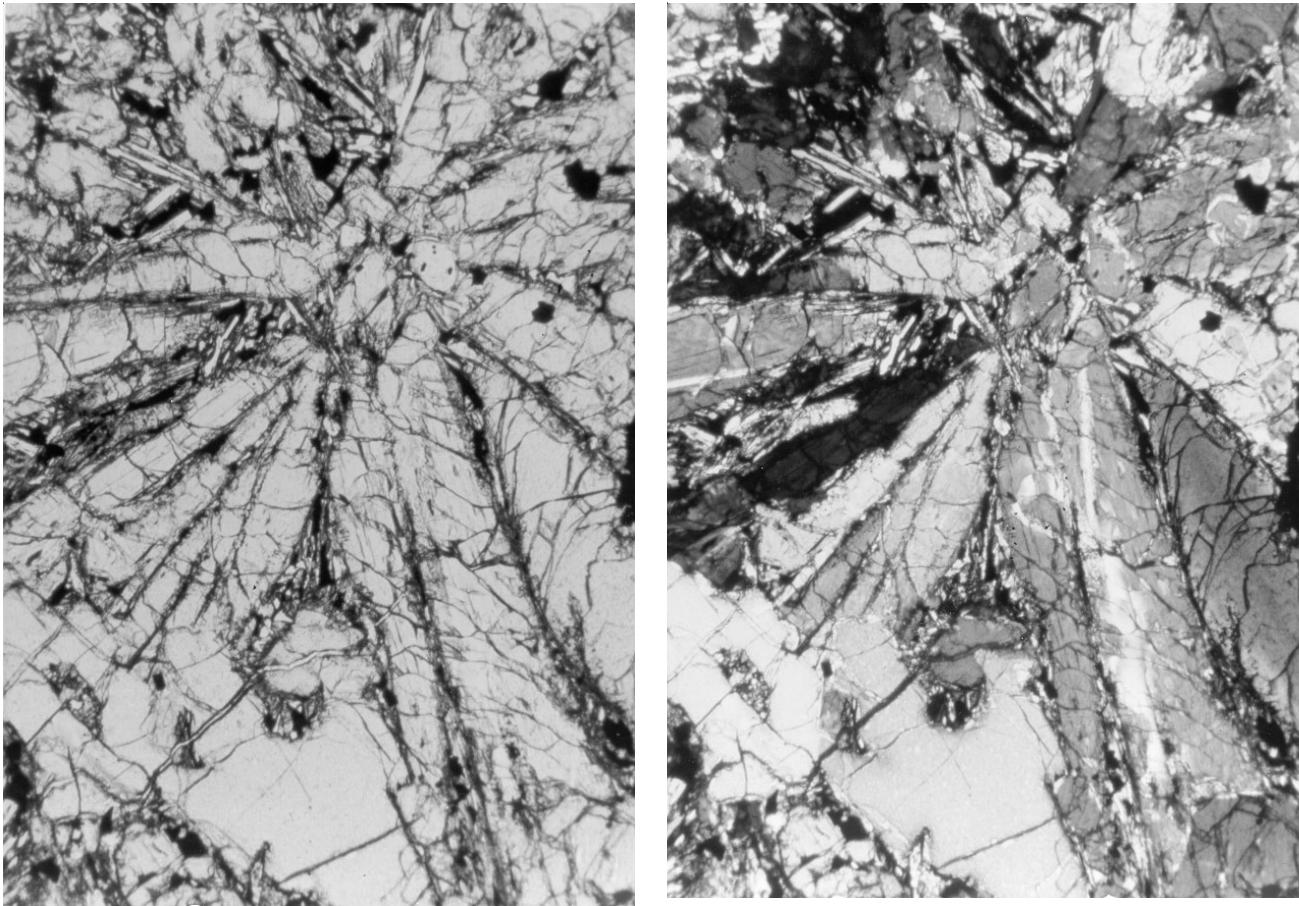
Not dated.

### Other Studies

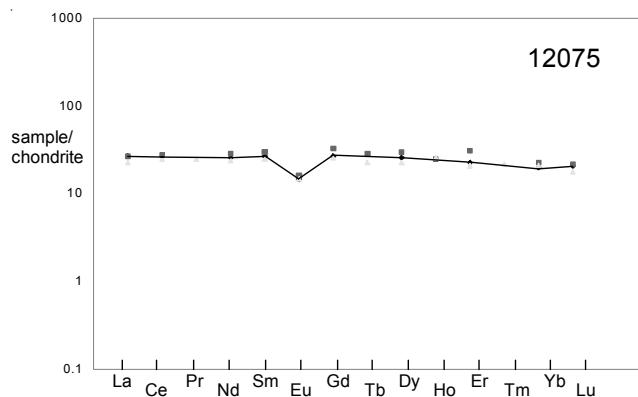
Bogard et al. (1971) and Funkhouser et al. (1971) reported the content and isotopic composition of rare gases in 12075. Wrigley (1971) determined the cosmic-ray-induced activity of <sup>22</sup>Na (74 dpm/kg) and <sup>26</sup>Al (107 dpm/kg).

### **List of Photo #s of 12075**

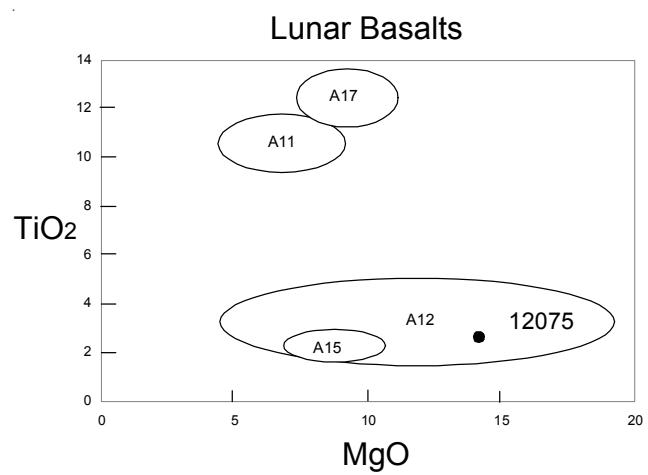
S69-61490 – 61513	B&W mug
S70-19108	
S70-19112 – 19122	B & W
S70-44014 – 44023	color
S70-49949 – 49954	TS



*Figure 4:* Photomicrographs of thin section 12075,25 showing pyroxene star. Length is 2.6 mm.  
NASA # S70-49953-954.



*Figure 6:* Normalized rare-earth-element pattern for 12075 (data from



*Figure 7:* Composition of 12075 compared with that of other Apollo 12 basalts.

**Table 1. Chemical composition of 12075.**

reference weight	Hubbard71 208 mg	Weismann75 208 mg	Cuttitta71 0.496	Wakita71a, b 0.523	Haskin71	Engel71	Wrigley 71	
SiO <sub>2</sub> %		44.8	(b)	41.1	(c)	45.06	(e)	
TiO <sub>2</sub>		2.55	(b)	3	2.6	2.84	(e)	
Al <sub>2</sub> O <sub>3</sub>		7.87	(b)	8.1	7.9	8.92	(e)	
FeO		20.7	(b)	21.6	(c)	20.23	(e)	
MnO		0.27	(b)	0.257	0.257	(c)	0.26	(e)
MgO		14.4	(b)	13.9	(c)	13.32	(e)	
CaO		8.53	(b)	8.4	8.5	(c)	8.64	(e)
Na <sub>2</sub> O		0.23	(b)	0.22	0.208	(c)	0.3	(e)
K <sub>2</sub> O	0.055	(a)	0.055	(a)	0.07	(b)	0.1	(c)
P <sub>2</sub> O <sub>5</sub>				0.08	(b)		0.16	(e)
S %								
<i>sum</i>								
Sc ppm		37	(b)	43	(c)	35		
V		158	(b)	210	190	(d)	180	
Cr		4000	(b)	4256		(c)	4700	
Co		69	(b)	61		(c)	40	
Ni		72	(b)				63	
Cu		8.5	(b)				6	
Zn								
Ga		4.8	(b)					
Ge ppb								
As								
Se								
Rb	0.993	(a)	0.993	(a)	1.4	(b)	1.4	(d)
Sr	94.3	(a)	94.3	(a)	59	(b)		95
Y				38	(b)	30	(d)	50
Zr				95	(b)			132
Nb								
Mo								
Ru								
Rh								
Pd ppb								
Ag ppb								
Cd ppb								
In ppb								
Sn ppb								
Sb ppb								
Te ppb								
Cs ppm					0.08	(d)		
Ba	63.9	(a)	63.9	(a)	58	(b)	30	66
La	3	(a)	6.34	(a)		5.8	5.3	(d) 6.33 (c)
Ce	16.1	(a)	16.1	(a)			14.9	(d) 17 (c)
Pr						2.2	(d)	
Nd	11.6	(a)	11.6	(a)			10.9	(d) 13 (c)
Sm	3.94	(a)	3.94	(a)		4.1	3.68	(d) 4.41 (c)
Eu	0.828	(a)	0.828	(a)		0.86	0.84	(d) 0.91 (c)
Gd	5.3	(a)	5.3	(a)			5.1	(d) 6.6 (c)
Tb						0.85	(d) 1.06 (c)	
Dy	6.22	(a)	6.22	(a)			5.7	(d) 7.26 (c)
Ho						1.46	(d) 1.37 (c)	
Er	3.73	(a)	3.73	(a)			3.4	(d) 5 (c)
Tm						0.54	(d)	
Yb	3.71	(a)	3.3	(a)	5.1	(b)	3.6	3.4 (d) 3.76 (c) 10
Lu	0.508	(a)	0.508	(a)			0.44	(d) 0.53 (c)
Hf					2.7			
Ta								
W ppb								
Re ppb								
Os ppb								
Ir ppb								
Pt ppb								
Au ppb								
Th ppm				0.7			0.62	(f)
U ppm							0.19	(f)

technique (a) IDMS, (b) mixed microchem., XRF, em. Spec., (c) INAA, (d) RNAA, (e) conventional wet, (f) radiation counting

# THE CHIPPING OF LUNAR ROCK 12075

DRWG. COMPLETED AUG. 10, 70

GENEALOGY

